

February 28, 1933

Dr. Harold B. Bohlman
214-17 Medical Arts Building
Cathedral Street at Read
Baltimore, Maryland

Dear Doctor Bohlman:

I am very glad to reply to your letter of February 25th in regard to possible lead absorption as the result of exposure to exhaust gas in flying. The greater part of the information which I have on this subject has not been published in the regular scientific publications. However, I and my associates here have a very considerable amount of work in connection with this problem. Since Dr. Edgar has given you the available data on animal experimentation as carried out by the Bureau of Mines, I shall limit myself to a brief statement of the facts as derived from the observation of persons who have had the severest exposure to exhaust gases from automobiles and also airplanes which made use of lead in gasoline as fuel. Our most important studies have been carried out on garage mechanics. Over a period of a number of years we have repeatedly examined garage mechanics who were selected for study because of the fact that they were working on automobiles which had used Ethyl Gasoline as an exclusive fuel over a period of years. No cases of lead poisoning have developed among this group of workers. Moreover, in using the most sensitive methods available for the study of the lead absorption of these men, it has not been possible to detect the occurrence of appreciable lead absorption as a consequence of their occupation, despite the fact that the exposure of many of these men to exhaust gas was sufficient to produce certain symptoms of carbon monoxide absorption. It could be said, of course, that the methods for the detection of lead absorption are not sufficiently sensitive for the purpose, except for the fact that we have shown that the daily absorption of amounts of lead as small as half a milligram can be detected by reason of measureable changes in the rate of lead excretion. Thus, we are now entirely certain that the absorption of lead from exhaust gas is an insignificant factor in general lead absorption. You need not have any anxiety, therefore, on this basis.

As a matter of fact, the limiting factor is that of the toxicity of carbon monoxide. As you are probably aware the carbon monoxide concentrations in the exhaust gas of gasoline motors runs from five percent upward. The amount in the air is

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unconsciousness is a very small fraction of this five percent. For this reason if the exhaust gas is so diluted as not to produce carbon monoxide intoxication, then the lead absorption becomes negligible. This statement of fact is substantiated by data of the Bureau of Mines which you have, but it has been further checked in such a way that there are now adequate data to demonstrate the applicability of these facts to human experience. If you are interested in the details of the matter, I can not cite you at the moment to any source of information. However, I am preparing a series of articles at present on the general subject of lead absorption, among which are recorded observations in this field. The data are so conclusive that I have no hesitation in stating the facts as I have done above. I can provide you with some of the data on the observations in a somewhat unfinished form, if you are sufficiently interested.

It may interest you to know that we have been following a group of men at Wright Field where certain items of experimental work with leaded fuel have been carried out with concentrations of lead in the gasoline of twice that which is available for commercial purposes. After a period of some three years of experience, these men failed to show any evidence of significant lead absorption.

Very truly yours,

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